OPERATING INSTRUCTIONS

MFM383/MFM383-S/MFM383-60Hz

96 x 96

FEATURES

- 3 lines, 3 digits per line
- Bar graph for current indication
- Auto / Manual page scrolling
- Universal auxiliary supply
- Measures all power parameters (RMS voltage, current, active power, apparent power, power factor, frequency and energy)
- Programmable CT primary

SPECIFICATIONS

Display

Liquid crystal display with backlight
3 lines, 3 digits per line to show all parameters
4th line, 8 digits to show energy
Bar graph for current indication

Display update time

10 sec for energy
2 sec for remaining parameters

Electrical input type

3 phase 4 wire and single phase

Rated input voltage

Line to Neutral : 350 VAC max (25 VAC min)

Rated input current

Nominal 5A AC (0.1 A min.)
(External CT required to be connected for MFM383-S model)

Auxiliary Supply

90 to 270 VAC/DC, 50/60Hz

Input Frequency

MFM383 : 50 Hz
MFM383-60Hz : 60 Hz
MFM383-S : 50/60Hz

Burden

0.2 VA max.@ 5A per phase
0.5 VA max. @5A per phase (for MFM383-S)

CT Primary

Programmable from 5 to 5000

Resolution

Parameters	CT Primary	Resolution
Current	<=10	0.01A
	>10 and <=100	0.1A
	>100 and <=1000	1A
	>1000	0.01 kA
kVA / kW	<=10	0.01k
	>10 and <=400	0.1k
	>400 and <=2800	1k
	>2800	0.01M

Parameter Measured/Calculated:

Parameters	Phase	Unit
Voltage	$V_{1N}, V_{2N}, V_{3N}, V_{12}, V_{23}, V_{31}$, $V_{avg\ L-N}$, $V_{avg\ L-L}$	V
Current	I_1, I_2, I_3, I_{avg}	I
Active Power	kW_1, kW_2, kW_3	W
Apparent Power	kVA_1, kVA_2, kVA_3	VA
Power Factor	Pf_1, Pf_2, Pf_3, Avg Pf.	Pf
Frequency	Hz	Hz
Energy	kWh	kWh

Accuracy Table:

Measurement	Accuracy
Voltage V_{L-N}	±0.5% of F.S. + 1 digit
Voltage V_{L-L}	±1% of F.S. + 1 digit
Average Voltage	±0.5% of F.S. + 1 digit
Current	±1% of F.S. + 1 digit
Average current	±1% of F.S.+ 1 digit
Frequency	± 0.1% ± 0.1Hz
Active Power	±1% of F.S. + 1 digit
Apparent power	±1% of F.S. + 1 digit
Power factor & Avg Pf	±0.01 PF + 1 digit
Energy	Class 1

NOTE:
The accuracy table is valid at respective operating frequencies only.

Temperature

Operating: 0 to 50 °C ; Storage: -20 to 75 °C

Humidity

85% non condensing

Mounting

Panel mounting

Weight

MFM383-S : 218 gms
MFM383 / MFM383-60Hz : 260 gms

SAFETY SUMMARY

All safety related codifications, symbols and instructions that appear in this operating manual or on the equipment must be strictly followed to ensure the safety of the operating personnel as well as the instrument. If the equipment is not handled in a manner specified by the manufacturer it might impair the protection provided by the equipment.

⚠ **CAUTION:** Read complete instruction prior to installation and operation of the unit.

⚠ **CAUTION:** Risk of electric shock.

WIRING GUIDELINES

⚠ **CAUTION:**

1. To prevent the risk of electric shock power supply to the equipment must be kept OFF while doing the wiring arrangement.

2. Wiring shall be done strictly according to the terminal layout. Confirm that all connections are correct.

3. Use lugged terminals.

4. To eliminate electromagnetic interference, use of wires with adequate ratings and twists of the same in equal size shall be made.

5. Cable used for connection to power source, must have a cross section of 1.5 mm^2. These wires shall have current carrying capacity of 5A.

MAINTENANCE

1.The equipment should be cleaned regularly to avoid blockage of ventilating parts.

2.Clean the equipment with a clean soft cloth . Do not use Isopropyl alcohol or any other cleaning agent.

INSTALLATION GUIDELINES

⚠ **CAUTION:**

1. This equipment, being built-in-type, normally becomes a part of main control panel and in such case the terminals do not remain accessible to the end user after installation and internal wiring.

2.Conductors must not come in contact with the internal circuitry of the equipment or else it may lead to a safety hazard that may in turn endanger life or cause electrical shock to the operator.

3. Before disconnecting the secondary of the external current transformer from the equipment, make sure that the current transformer is short circuited to avoid risk of electrical shock and injury.

⚠ **CAUTION:**

1.The equipment shall not be installed in environmental conditions other than those mentioned in this manual.

2.The equipment does not have a built-in-type fuse. Installation of external fuse of rating 275VAC/1A for electrical circuitry is highly recommended.

3.Thermal dissipation of equipment is met through ventilation holes provided on chassis of equipment. Such ventilation holes shall not be obstructed else it can lead to a safety hazard.

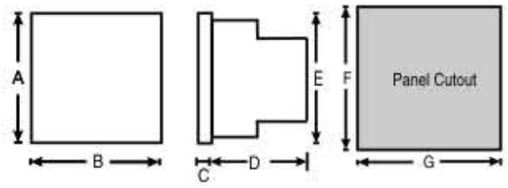
4.Connectors screws must be tightened after installation.

MECHANICAL INSTALLATION:

For installing the meter

1. Prepare the panel cutout with proper dimensions as shown below :

OVERALL DIMENSIONS (All dimensions in mm)



MODEL / DIM	A	B	C	D	E	F	G
MFM383	99	99	5	46	91	92	92

2.Push the meter into the panel cutout. Secure the meter in its place by pushing the clamp on the rear side. The screws of the panel of the clamp must be in the farthest forward slot.
3.For proper sealing, tighten the screws evenly with required torque.

⚠ **CAUTION:**
The equipment in its installed state must not come in close proximity to any heating sources, caustic vapors, oils, steam, or other unwanted process byproducts.

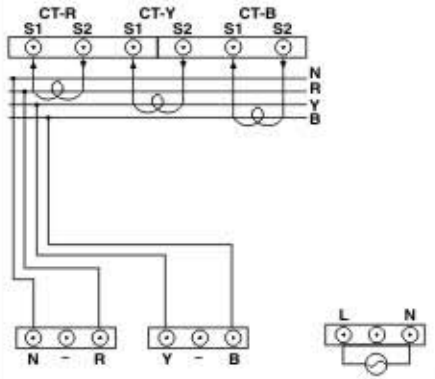
EMC Guidelines:

1.Use proper input power cables with shortest connections and twisted type.

2.Layout of connecting cables shall be away from any internal EMI source.

TERMINAL CONNECTIONS:

MFM383 / MFM383-S / MFM383-60 Hz



FRONT PANEL DESCRIPTION

Bar Graph Indication

In MFM 383, the bar graph shows the percentage of current flowing through the load. The Bar graph shows the 25, 50, 75, 100, 125 and 150% of rated input current.

Keys Description

Sr No	Functions	Key press
1	To scroll through the pages in forward direction in manual mode.	⊙ + ▲ to next pages
2	To scroll through the pages in reverse direction in manual mode.	⊙ + ▼ to previous pages
3	To toggle between auto/manual scrolling.	▼ (A/M) for three seconds
4	To enter in configuration mode.	▼ (A/M) + ▲ (PRG) for 3 seconds
5	To increase and decrease all parameter	⊙ + ▲ Increase ⊙ + ▼ Decrease

NOTE :

1) Continuous operation of ⊙+▼/▲ makes update speed faster in 3 stage after 7 seconds.
2) CT updates in steps of 5 after CT setting has reached to 100, in steps of 10 after CT setting has reached 1000. Eg : After 1000, the display increments to 1.01 i.e.1010.

CONFIGURATION SCHEME

1)Continuous pressing of ▼ (A/M) + ▲ (PRG) for 3 seconds initiates the programming mode.
2)Program settings are as given below.

Key press	Display	Description
1. To configure CT primary	Default setting: 5	
NOTE: External CT of rating 5A required to be connected for MFM383-S model.		
Press ⊙+▼/▲	CT 5	**CT Primary** Range: 5 to 5000 A
*Display shows	CT 100	When CT is 1000
2. Press ▼ to Reset count	Default setting: no	
	rSt no	**Reset** Reset NO
Press ⊙+▼/▲	rSt YES	Reset YES
NOTE: On selecting 'Reset YES', only energy(kWh) will be Reset.		

NOTE :

1) Press ▼ (A/M) + ▲ PRG Key for three seconds to come out of programming.
2) The unit will auto exit program mode after 60 sec. of inactivity.

DISPLAY PARAMETER PAGE DESCRIPTION

There are two methods to scroll through the different parameter pages on the display.
1) Auto mode.
2) Manual mode.

Auto mode:

In auto mode, it allows you to monitor all pages sequentially at an interval of 5 seconds without any key press. Each page contains 3 parameters.

NOTE : By default the unit works in auto mode.

Manual mode:

In manual mode, using the ⊙ +▼/▲ keys different parameter pages can be viewed. In the manual mode the displayed page is seen until you manually change the page.

The parameter pages are as shown in the adjoining figures.

NOTE :

When meter turns to manual mode display shows MAn momentarily.

When meter turns to auto mode display shows AUt momentarily.

Error indications

Error	Description
Ctr	CT reverse

Ctr error occurs if

1. The CT secondary wires S1 & S2 are swapped in wiring.
2. The CT inputs are not connected to their respective phases that is CT1 to R phase, CT2 to Y phase and CT3 to B phase

NOTE: Ctr error displayed only on Active Power page and Power Factor page

PAGE 1:

Display shows Line to Neutral Voltage & Energy .

1) V_{1N}
2) V_{2N}
3) V_{3N}
4) kWh (Energy)
*The CT primary set at 5.

5) $I_1 \approx 2.5$ i.e. 50%
6) $I_2 \approx 5$ i.e. 100%
7) $I_3 \approx 7.5$ i.e. 150%

Press ⊙ + ▲ to go in to next page

PAGE 2:

Display shows Line to Line voltage (V_{L-L})

1) V12
2) V23
3) V31
4) kWh (Energy)
*The CT primary set at 5.

5) $I_1 \approx 2.5$ i.e. 50%
6) $I_2 \approx 5$ i.e. 100%
7) $I_3 \approx 6.25$ i.e. 125%

Press ⊙ + ▲ to go in to next page

PAGE DESCRIPTION (CONTINUED)

PAGE 3:

Display shows Current of each Phase & Energy.

1) A1
2) A2
3) A3
4) kWh (Energy)

*The CT primary set at 5.

5) $I_1 \approx 2.5$ i.e. 50%
6) $I_2 \approx 5$ i.e. 100%
7) $I_3 \approx 6.25$ i.e. 125%

Press + to go in to next page

PAGE 4:

Display shows AV, AC, Frequency & Energy

1) Average voltage V_{L-N}
2) Average Current
3) Frequency
4) kWh (Energy)

*The CT primary set at 5.

5) $I_1 \approx 2.5$ i.e. 50%
6) $I_2 \approx 5$ i.e. 100%
7) $I_3 \approx 6.25$ i.e. 125%

Press + to go in to next page

PAGE 5:

Display shows AV, AC, APF & Energy

1) Average Voltage V_{L-L}
2) Average Current
3) Average Power factor
4) kWh (Energy)

*The CT primary set at 5.

5) $I_1 \approx 2.5$ i.e. 50%
6) $I_2 \approx 5$ i.e. 100%
7) $I_3 \approx 6.25$ i.e. 125%

Press + to go in to next page

PAGE 6:

Display shows Active Power & Energy

1) kW1
2) kW2
3) kW3
4) kWh (Energy)

*The CT primary set at 5.

5) $I_1 \approx 2.5$ i.e. 50%
6) $I_2 \approx 5$ i.e. 100%
7) $I_3 \approx 6.25$ i.e. 125%

Press + to go in to next page

PAGE 7:

Display shows Apparent Power & Energy

1) kVA 1
2) kVA 2
3) kVA 3
4) kWh (Energy)

*The CT primary set at 5.

5) $I_1 \approx 2.5$ i.e. 50%
6) $I_2 \approx 5$ i.e. 100%
7) $I_3 \approx 6.25$ i.e. 125%

Press + to go in to next page

PAGE 8:

Display shows Power Factor of each Phase & Energy

1) Pf1
2) Pf2
3) Pf3
4) kWh (Energy)

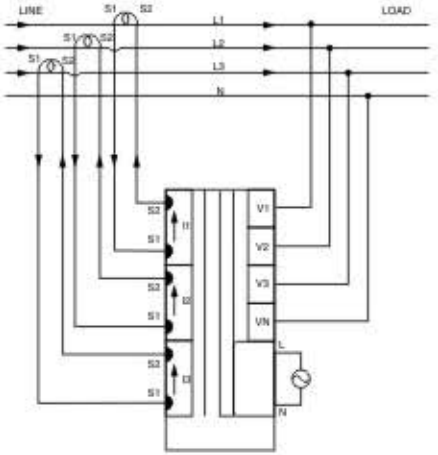
*The CT primary set at 5.

5) $I_1 \approx 2.5$ i.e. 50%
6) $I_2 \approx 5$ i.e. 100%
7) $I_3 \approx 6.25$ i.e. 125%

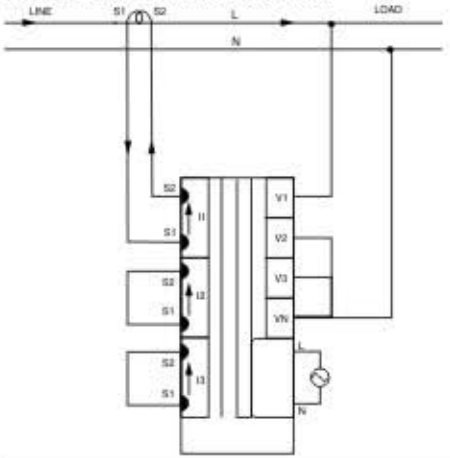
Press + to go in to first page

WIRING DIAGRAM

3 PHASE 4-WIRE WIRING DIAGRAM



SINGLE PHASE WIRING DIAGRAM



(Specifications subject to change as development is a continuous process)

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